

Occultation of δ^3 Tauri. By J. Joynson, Esq.

9th November, 1870.

Disappearance	..	^h ^m ^s 11 19 11.3	G.M.T.
Reappearance	..	12 16 50.7	

The above observation was very satisfactory. The star disappeared at the bright and reappeared at the dark limb of the Moon; and the times above given agreed very closely with a calculation made for this place with the aid of Prof. Chevallier's method, which gave for the

Disappearance	..	^h ^m 11 19.0
Reappearance	..	12 16.5

Lat. $53^{\circ} 28' 24''$ N.

Lon. $0^{\circ} 12' 7''$ W.

Waterloo, near Liverpool,
6th Dec. 1870.

Notice of a presumed new Variable Star in the Constellation of Orion. By the Rev. T. W. Webb.

On December 25, 1869, while sweeping over a part of the constellation of *Orion* with a power of 65 on my 9-inch silvered speculum by With, I came across a red star, which I then estimated of the 10th magnitude, and considered less deep than *R Leonis*, but still of a conspicuous colour, not unlike *R Crateris*.

Dec. 27.—I have noted that it was one of a triple group, the others being smaller, about 11 mag. of the Bedford Catalogue, and situated at position-angles roughly estimated at 230° and 340° .

Jan. 26, 1870, on looking for this object with a power of 110, I was at once struck with its increased brightness: it seemed much more strongly contrasted with its two companions, and I thought it nearly of 9 mag.; the colour I considered not greatly inferior to that of Hind's crimson star.

Jan. 27.—I have noted that the triplet is in the middle of a large triangle of stars, the brightest of which, a white 9 mag. star, nearly precedes it; the other two, at the *nf* and *sf* angles, being about 10 mag. The ruby star, approaching more nearly to the brightness of the first than of the others, might be rated about 9.3 mag. The accompanying rough eye-sketch may serve to give an idea of the configuration.

Feb. 25.—I did not think it any larger than on Jan. 26, but

the colour struck me as very fine. I also noted two minute points north of it.

March 5.—If it had changed at all, it might be rather smaller, the colour remaining as before.

Thus far the observations seemed to indicate a probability of variable light, as in the case of so many ruddy stars; but I was not strongly impressed by it, as I thought my earlier estimates of its magnitude might not have been made with sufficient care.

On looking for it again, however, on Dec. 23, 1870, very nearly twelve months after its first discovery, with the same power of 65 which I had most frequently used on former occasions, I found that no doubt remained as to this point. I could only see a group of three minute stars of nearly the same magnitude, all too small to show such a colour as was vividly impressed on my recollection: I noted in fact no difference of tint among them: but had it existed, the object would have been far too inconspicuous to attract attention, as it had done, in casual sweeping. The eyepiece was now slightly dewed; but the estimate, being a comparative one, was unaffected by this circumstance. As far as I could recollect the situation of the red star, I should have expected to have found it the central one of the three; but on subsequently comparing my former observations without attending to the estimated position-angles, I was so far misled by the mention, on Feb. 25, of "two minute points north of it," and in some degree, perhaps, by an idea that it might still be the brightest of the group, that I concluded that it must be the *sp* of the three little stars.

Dec. 24.—There being a good deal of haze, I considered that this *sp* star could not exceed 11 mag., and I noted that it was but a trifle brighter than its companions.

Dec. 26.—In thin haze; the same star was found to be very little brighter than the other two, and decidedly much inferior to the two stars at the *nf* and *sf* angles of the including triangle, which, supposing it to have been the red star, it surpassed on Jan. 27.

At last, on Dec. 29, notwithstanding a little fog, I was able to discover the error into which I had fallen. I had a very satisfactory view of the group with 65, and the distinct ruby hue which I perceived, and confirmed with an achromatic ocular of 212, convinced me that not the brighter *sp* star of the triplet, but the central one, was the object formerly observed: thus giving incidentally somewhat more weight to the evidence of variation. I repeated my guesses at the position-angles, and found them as on Dec. 27, 1869. The magnitude of the red star I now estimated at 11, that of the *sp* star 10.5, that of the remaining *n* star of the group 11.2: the *p* star of including triangle being considered 8, the *sf* 9.3, and the *nf* 9.5. Two minuter points, *n* and *f*, may have been about 13 mag.

I have only one further observation to add, that of Jan. 9, 1871, when I had an impression that the red star was slightly on

the increase, as its brightness was little, if at all, inferior to that of its *sp* companion. I was then also enabled to recover the second minute point north of it, which I had not noticed since Feb. 25, 1870, and which probably may not exceed 14 mag.

I have little confidence in my own estimates of absolute magnitude, but the star in question is so very favourably situated for comparison, that I have no misgiving as to the relative values that I have assigned to it; and these appear to me to establish in a very satisfactory manner the existence of variable light; leaving for future examination its amount, its period, and its epochs. All that can at present be inferred is that one *maximum* may probably have occurred in the spring of 1870; and that if now, as I suspect, on the increase, it must have subsequently passed a *minimum* stage. The range of variation hitherto observed may be assumed as extending through upwards of 1.5 magnitude of Admiral Smyth's scale.

Through the kindness of Mr. Knott, to whom I communicated my earlier suspicions of variability, I am informed that this star appears in Schmidt's Berlin Chart, and is marked in the accompanying catalogue as of 9 mag. the white star *p* being rated 8 mag. On Jan. 5, 1870, Mr. Knott estimated the magnitude of the variable star 9.5.

I have at present no means of giving its place with accuracy; but it is easily found about $6^m 18^s$ in time west of 42° *Orionis*, and nearly on the parallel of a minute open pair, about 11 mag. 9' or 10' north of that star.

Minor Planet (110).

The following elements, calculated by Herr Oppenheim from observations, Bilk and Leipsig, April 20; Berlin, May 3 and 20; are given, *Ast. Nach.* No. 1805:—

	1870, April 22.5	Berlin (?) M.T.
M	=	$193^{\circ} 18' 54.3''$
ω	=	$300^{\circ} 17' 16.5''$
Ω	=	$59^{\circ} 9' 58.6''$
i	=	$5^{\circ} 52' 11.9''$
ϕ	=	$4^{\circ} 38' 15.0''$
μ	=	$803'' 712$
log a	=	0.429938
